

ENGINEERING SOILS - MAP OF VIGO COUNTY,
INDIANA

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BY

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JHRP

JOINT HIGHWAY RESEARCH PROJECT

PURDUE UNIVERSITY AND
INDIANA STATE HIGHWAY COMMISSION

Final Report

ENGINEERING SOILS MAP OF VIGO COUNTY, INDIANA

TO: J. F. McLaughlin, Director
Joint Highway Research Project

August 11, 1971

File: 1-5-2-51

FROM: H. L. Michael, Associate Director
Joint Highway Research Project

Project: C-36-1

The attached report, entitled "Engineering Soils Map of Vigo County, Indiana", completes a portion of the project concerned with development of county engineering soils map of the state of Indiana. This is the 51st report in the series. The report was prepared by Dr. P. T. Yeh, Research Engineer, Joint Highway Research Project.

The soils mapping of Vigo County was done primarily by airphoto interpretation. Several soil profiles sampled by the soil conservation service and some test data along Interstate 70 are included in the report. Generalized soil profiles of the major soil for each land form are presented on the engineering soils map. An ozalid print of the Engineering Soils Map of Vigo County is included in the report.

Respectfully submitted,

Harold L. Michael

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by
P. T. Yeh
Research Engineer

Joint Highway Research Project

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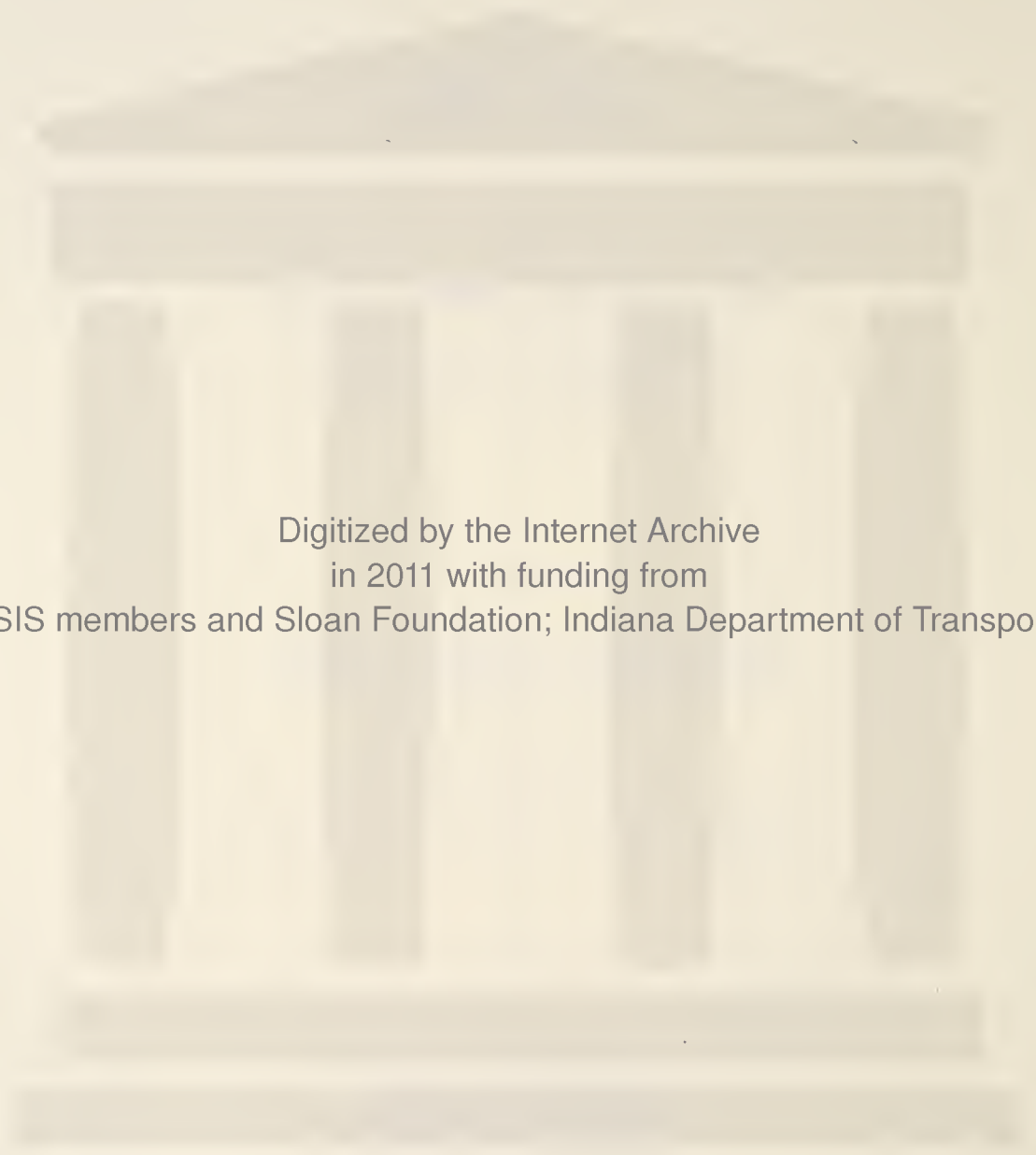
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Purdue University

In Cooperation With

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ENGINEERING SOILS MAP OF VIGO COUNTY, INDIANA

by

P. T. Yeh

INTRODUCTION

The Engineering Soils Map of Vigo County, Indiana which accompanies this report was compiled from 7" x 9" aerial photographs having an approximate scale of 1:20,000. The aerial photographs were taken in August of 1939 for the United States Department of Agriculture and were purchased from that agency.

Aerial photographic interpretation of the land forms and engineering soils of this county was accomplished in accordance with accepted principles of observation and inference (1)*. Field trips were made to the area for the purposes of resolving ambiguous details and correlating aerial photographic patterns with soil textures. Standard mapping symbols developed by the staff of the Airphoto Interpretation Laboratory, School of Civil Engineering, Purdue University, were employed to delineate land forms and soil textures. The text of this report largely represents an effort to overcome the limitation imposed by adherence to a standard symbolism and map presentation.

Soil samples of typical profiles at eight sites were collected and studied by personnel of the Soil Conservation

* Figures in parentheses refer to references appearing in the bibliography.

Service assisted by the author. The soil samples were tested by personnel of the Joint Highway Research Project of Purdue University. General soil profiles shown on the soils map were compiled from the agriculture literature, soil samples and from the boring data of the roadway soil survey along interstate I-70 supplied by the Indiana State Highway Commission.

Liberal reference was made to the "Soil Survey Information and Interpretations Vigo County, Indiana" (2) and the general soil map of Vigo County provided by the Soil Conservation Service (their soil survey of Vigo County will be published in the near future).

DESCRIPTION OF AREA

General

Vigo County is located in the west-central part of Indiana (Figure 1). The western boundary of the county is the Illinois-Indiana state line. The maximum width (east and west) of about 20 miles occurs three miles north of the southern boundary. With a nearly constant length (north and south) of 24 miles, Vigo County has an area of 415 square miles or 265,600 acres (3). Terre Haute is the county seat and the largest city of Vigo County. It is located near the geometrical center of the county on the east bank of the Wabash River. A population of 114,518 inhabitants resided within the county in the 1970 census (4). Among those 70,286 live in the city of Terre Haute (4).

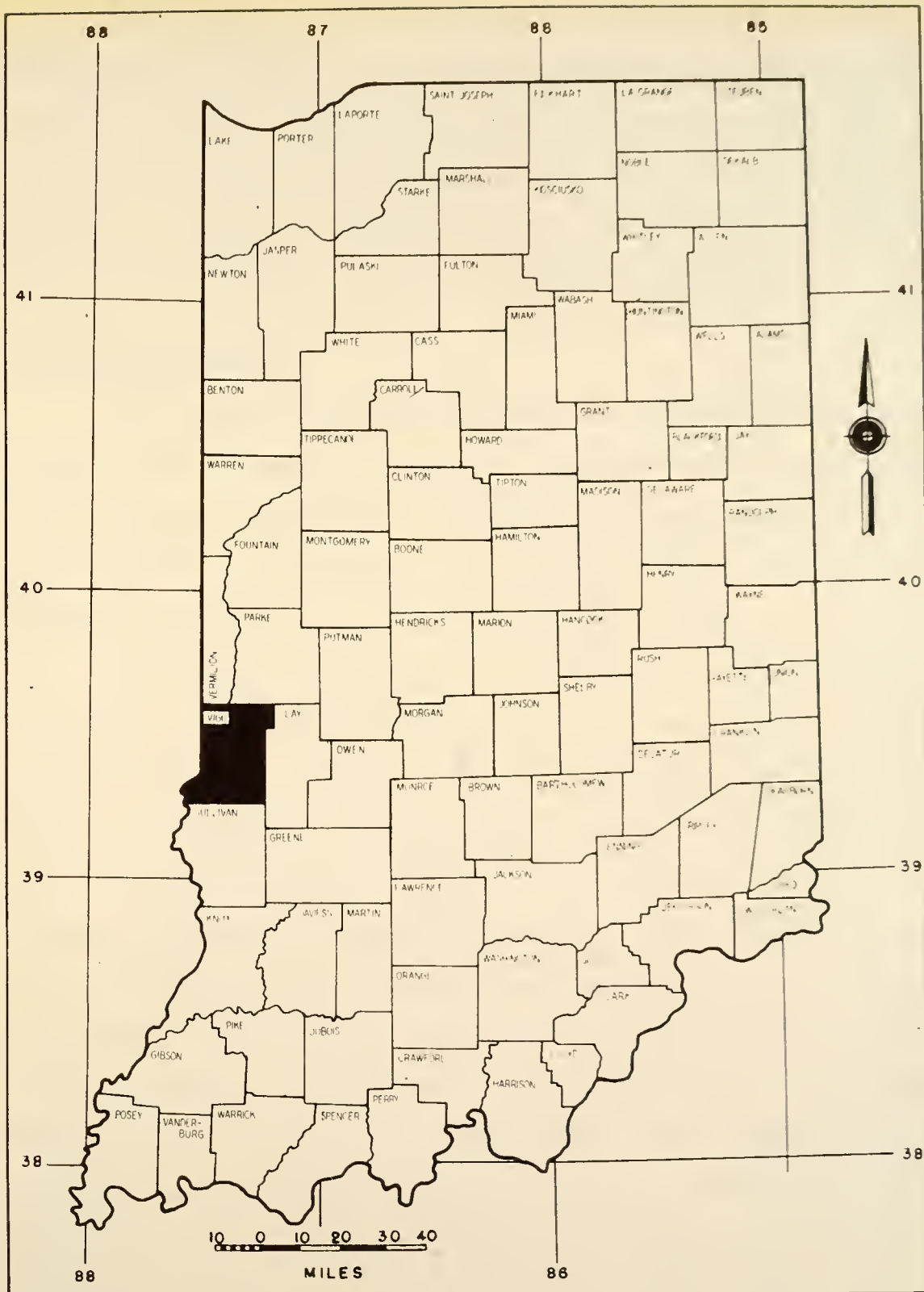


FIG. 1 LOCATION MAP OF VIGO COUNTY

According to the 1964 Census of Agriculture 63.4% of Vigo County or 168,478 acres was farmland (5). There were 19,880 acres of wooded land in the county (5), which was generally confined along streams and rivers as shown in Figure 2. With the ever increasing strip mining activity the acreage of farmland is being reduced accordingly.

Drainage Features

Vigo County lies wholly within the drainage basin of the Wabash River (Figure 3). About 25 square miles in the southeastern part of the county drained by Splunge Creek is in the Eel River subdivision of the White River basin which in turn is a subdivision of the Wabash River basin.

The Wabash River flows in a preglacial valley which is revealed by the map showing depth to bedrock (Figure 4). The Wabash Valley served as a sluiceway during glacial times (6). The valley attains a width of five miles just three miles below the northern county border. The gradient of the Wabash River is about eight inches per mile in Vigo County (6).

The principal surface drainage system is well developed throughout the county. The major tributaries of the Wabash River are deeply entrenched. The drainage lines east of the Wabash River tend to follow the slope of the bedrock strata. Streams such as Spring, Otter, Lost, Honey and Prairie Creeks appear to be deflected near the Wabash River by the massive terraces. Coal Creek and Sugar Creek are the major tributaries from the west. Rock control may be noticed along their courses.

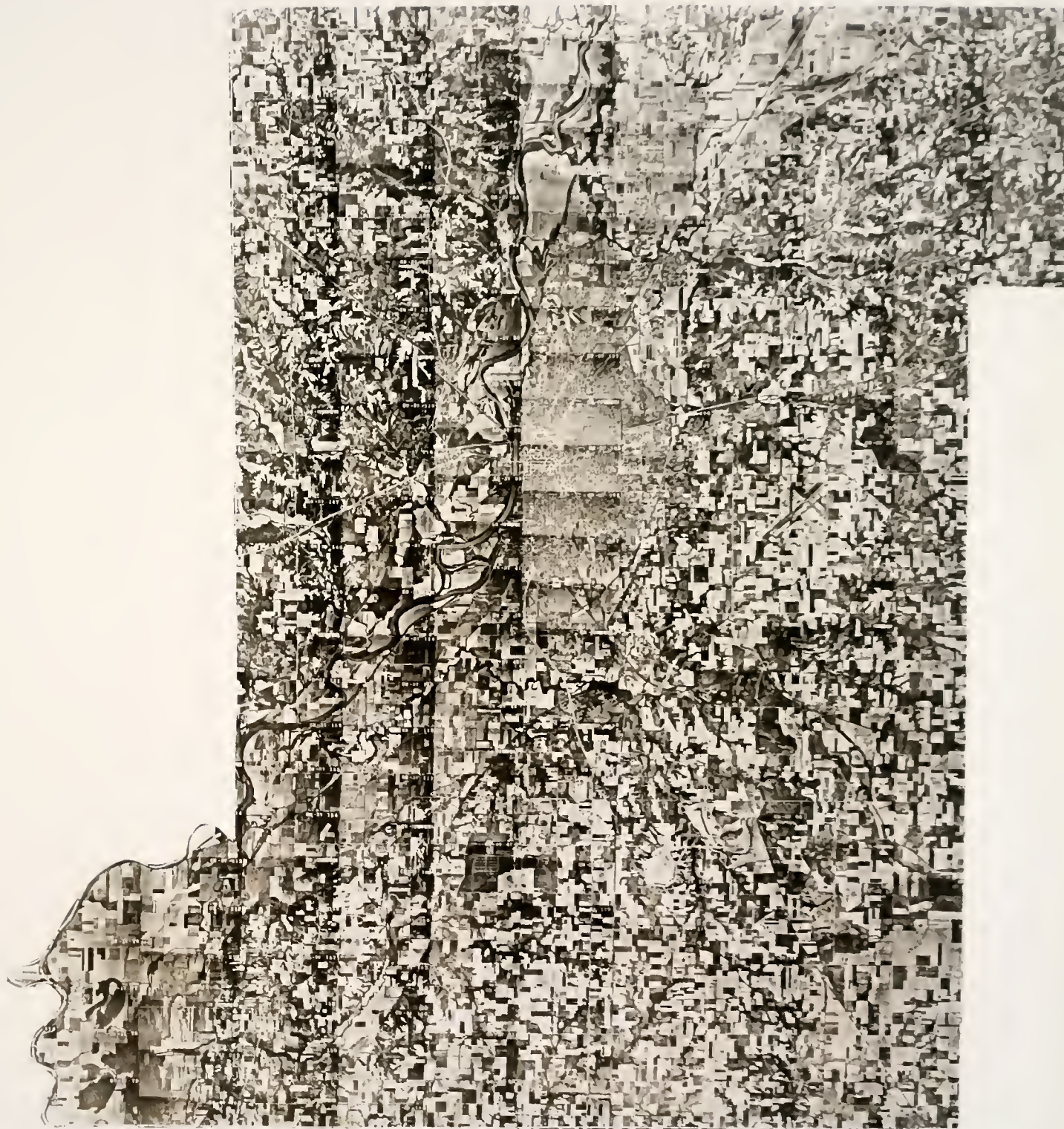


FIG. 2 AIRPHOTO MOSAIC OF VIGO COUNTY, INDIANA

FROM 1958 INDEX MAP

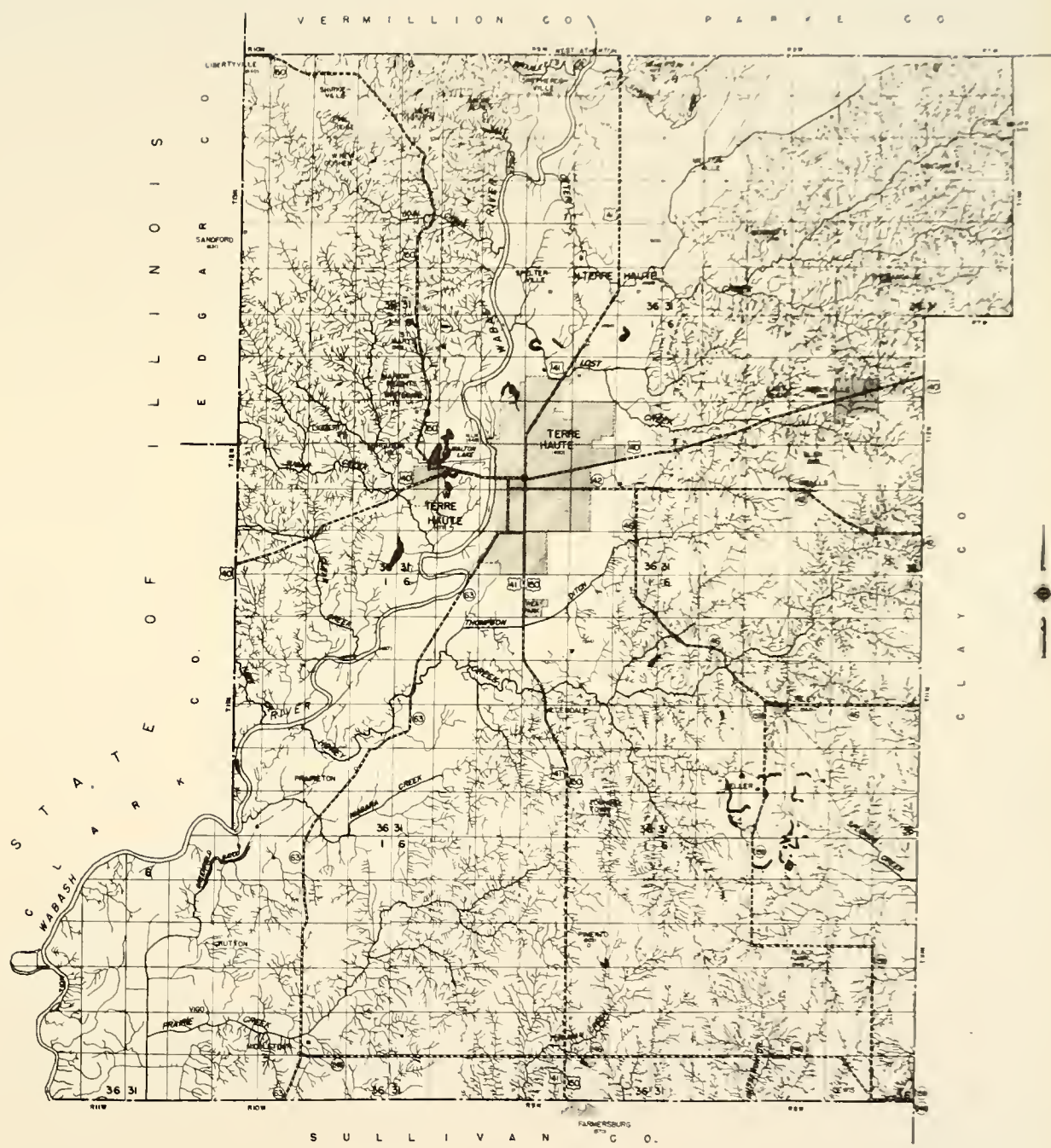


FIG. 3
DRAINAGE MAP
VIGO COUNTY

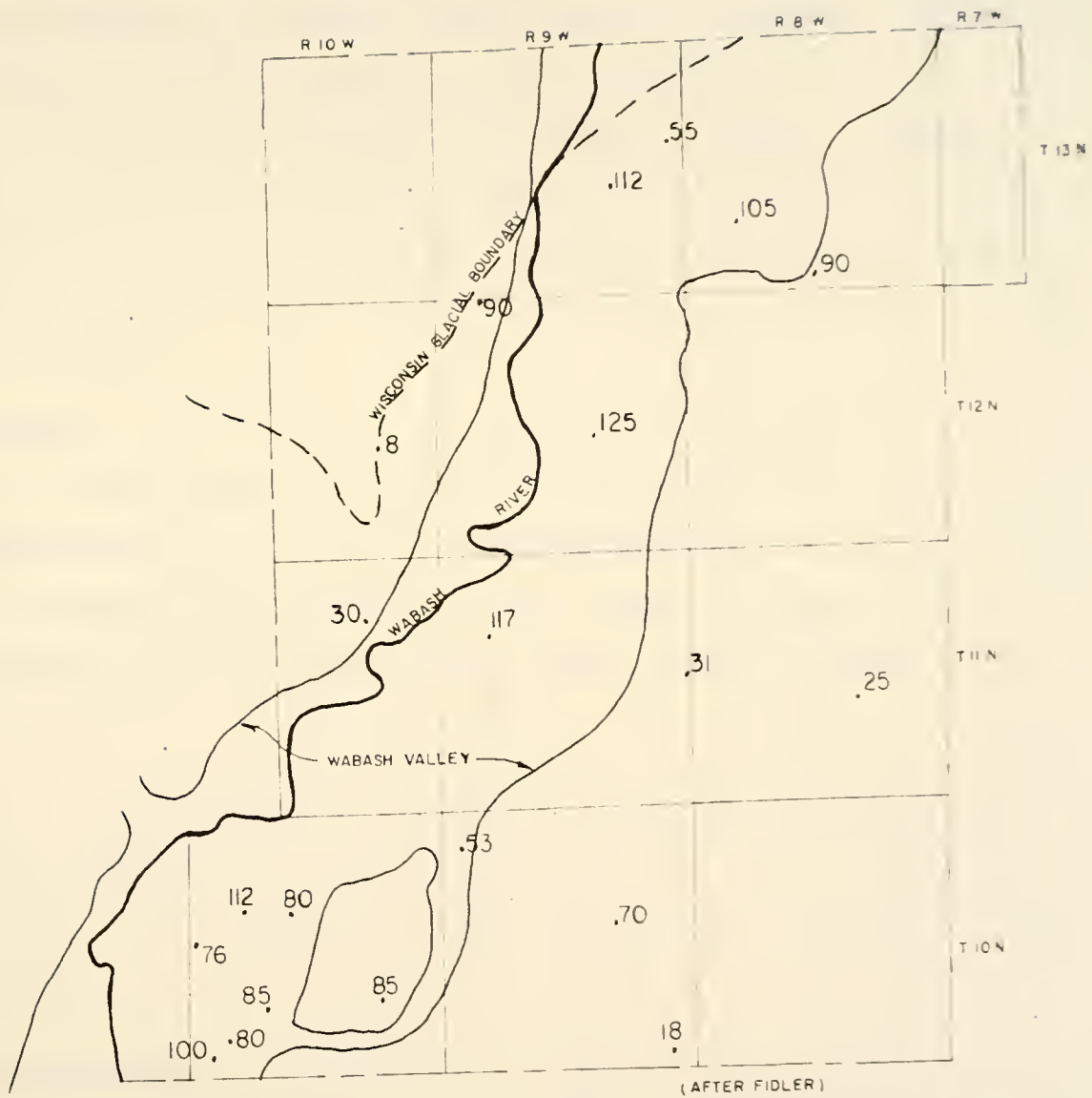


FIG. 4 MAP SHOWING DEPTH TO BEDROCK IN VIGO COUNTY.

The drainage patterns are fine-textured in the dissected portion of the moraine and along the valleys of the major drainage canals. In the flat regions, streams have been straightened and ditches have been constructed to improve sluggish drainage conditions (See Figure 3).

There are no natural lakes in Vigo County. However, lakes and ponds of various origins are scattered over the area. Most of them are the result of gravel pit and strip mining operations.

Climate

The climate of Vigo County is continental, humid, and temperate. The warm humid and moderately cold winters are characterized by frequent sudden changes of temperature. Precipitation is rather evenly distributed throughout the year.

The average mean, maximum and minimum temperature and mean temperature collected from 1900 to 1953 is listed in Table 1. The data taken from 1955 to 1966 is shown in Table 2 (7).

Physiography

Except for the northwestern corner, Vigo County lies within the Wabash Lowland physiographic region of the state (Figure 5). The area in the northwestern corner of the county belongs to the Tipton Till plain physiographic region. With respect to its physiographic situation in the United States, Vigo County is a part of the Till Plain Section of the Central Lowland Province (8).

TABLE 1. AVERAGE TEMPERATURE AND PRECIPITATION IN TERRE HAUTE
FROM 1900 TO 1953

<u>Month</u>	<u>Temperature</u>			<u>Precipitation</u>
	<u>Mean °F</u>	<u>Average Max. °F</u>	<u>Average Min. °F</u>	<u>Mean</u>
Jan	30.7	38.5	22.9	3.12
Feb	33.2	41.3	25.0	2.06
Mar	42.4	51.5	33.2	3.81
Apr	53.2	63.0	43.4	3.57
May	63.7	73.9	53.5	4.18
June	73.5	83.6	63.3	4.21
July	77.7	88.3	67.0	2.83
Aug	75.4	85.8	64.9	3.55
Sept	68.3	78.9	57.6	3.82
Oct	57.1	67.8	46.4	2.82
Nov	43.7	52.0	35.3	2.91
Dec	33.0	40.3	25.6	2.70
Annual	54.3	63.7	44.8	39.58

TABLE 2. AVERAGE AND EXTREMES OF TEMPERATURE AND PRECIPITATION
AT TERRE HAUTE, INDIANA

<u>Month</u>	<u>Temperature</u>			<u>Precipitation</u>		<u>Year</u>
	<u>Average °F</u>	<u>Absolute Maximum °F</u>	<u>Absolute Minimum °F</u>	<u>Average Inches</u>	<u>Greatest Daily</u>	
Jan	26.6	67	-19	1.92	2.53	1959
Feb	30.7	67	- 9	1.94	1.68	1961
Mar	39.3	80	- 8	2.75	1.95	1961
Apr	53.5	86	21	4.01	1.98	1958
May	63.5	94	30	4.32	2.66	1961
June	71.5	101	40	4.01	3.52	1958
July	75.3	101	46	4.38	3.00	1961
Aug	73.8	100	43	2.81	2.22	1957
Sept	67.7	98	34	3.21	3.52	1961
Oct	56.3	90	20	1.64	1.48	1958
Nov	43.3	80	1	3.11	2.34	1958
Dec	31.0	68	-11	2.43	2.26	1958
Year	52.7	101	-19	36.53	3.52	

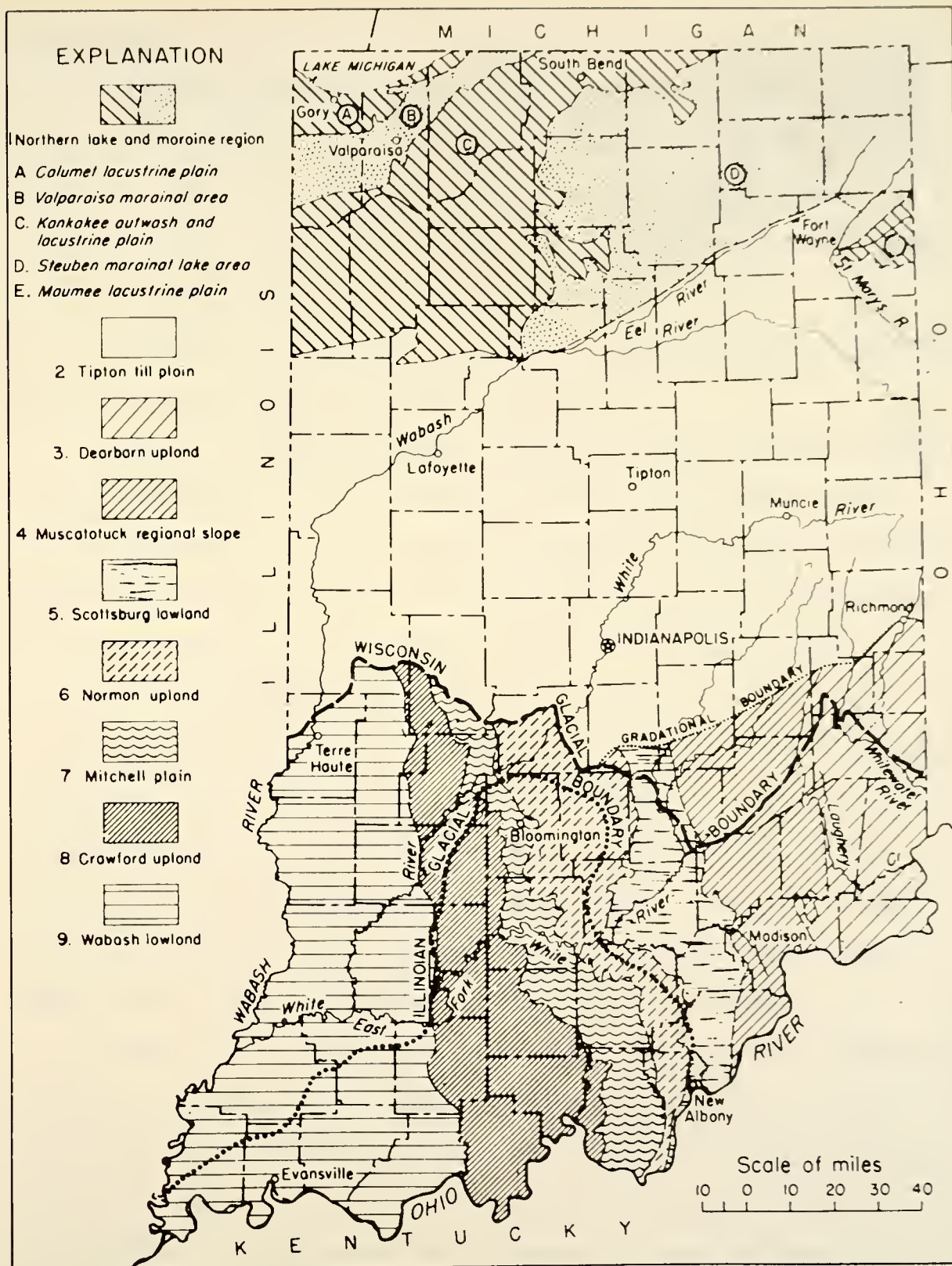


Figure 5 Map of Indiana showing regional physiographic units based on present topography. Modified from Malott

Topography

Physiographically Vigo County is a plain of low relief. Topographically it consists of a rolling to undulating moranic belt on the northwestern corner, a slightly undulating Illinoian till plain, and a wide (5 to 6 miles) flat to nearly level valley of the Wabash River.

The undulating plain is deeply dissected by the tributaries of the Wabash River as shown in Figure 6.

Within the Wabash Valley, there is a flat alluvial plain which ranges from 14 to 18 feet above the low water, and scattered over the valley are many ponds and sluggish streams. Between the bluff and the flood plain there are remnants of a low terrace on the west side and a large high terrace (occupies two thirds of the valley) to the east. The high terrace, referred to as the Shelbyville terrace by Fidler (6), stands 75 feet above river level north of Terre Haute and gradually slopes toward the south to merge with the flood plain at the southern border of the county. The low terrace is about 30 feet below the high terrace and is considered as the Maumee erosional terrace relic by Fidler (Figure 7).

Rolling sand dunes and loess hills are scattered throughout the high and low terraces, within the Wabash and some tributary valleys and along the valley wall. These wind blown deposits obliterate the underlying materials and creates difficulty in delineating the terraces in the southern part of the county. Regions bordering the major streams and their tributaries are extremely rugged.

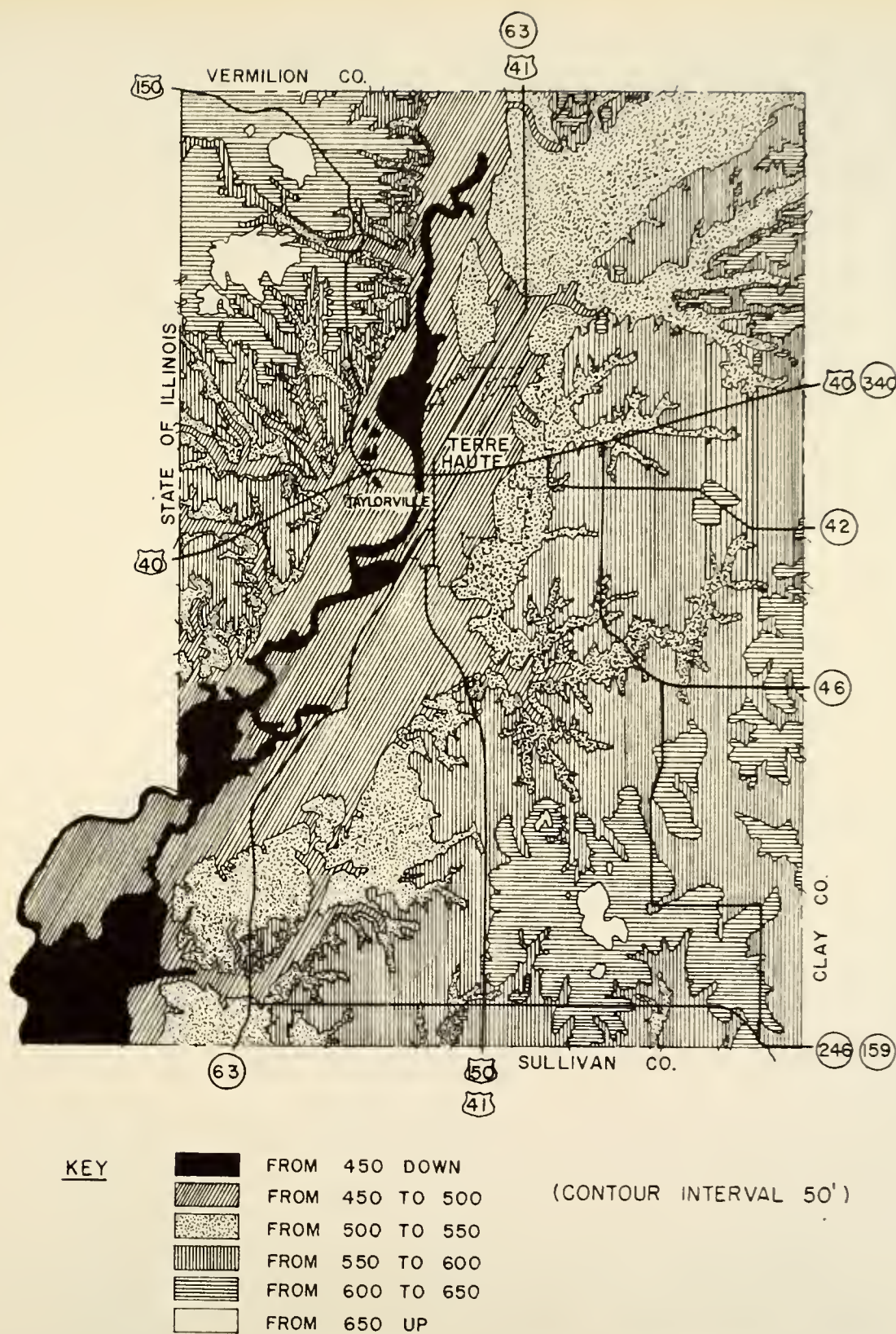
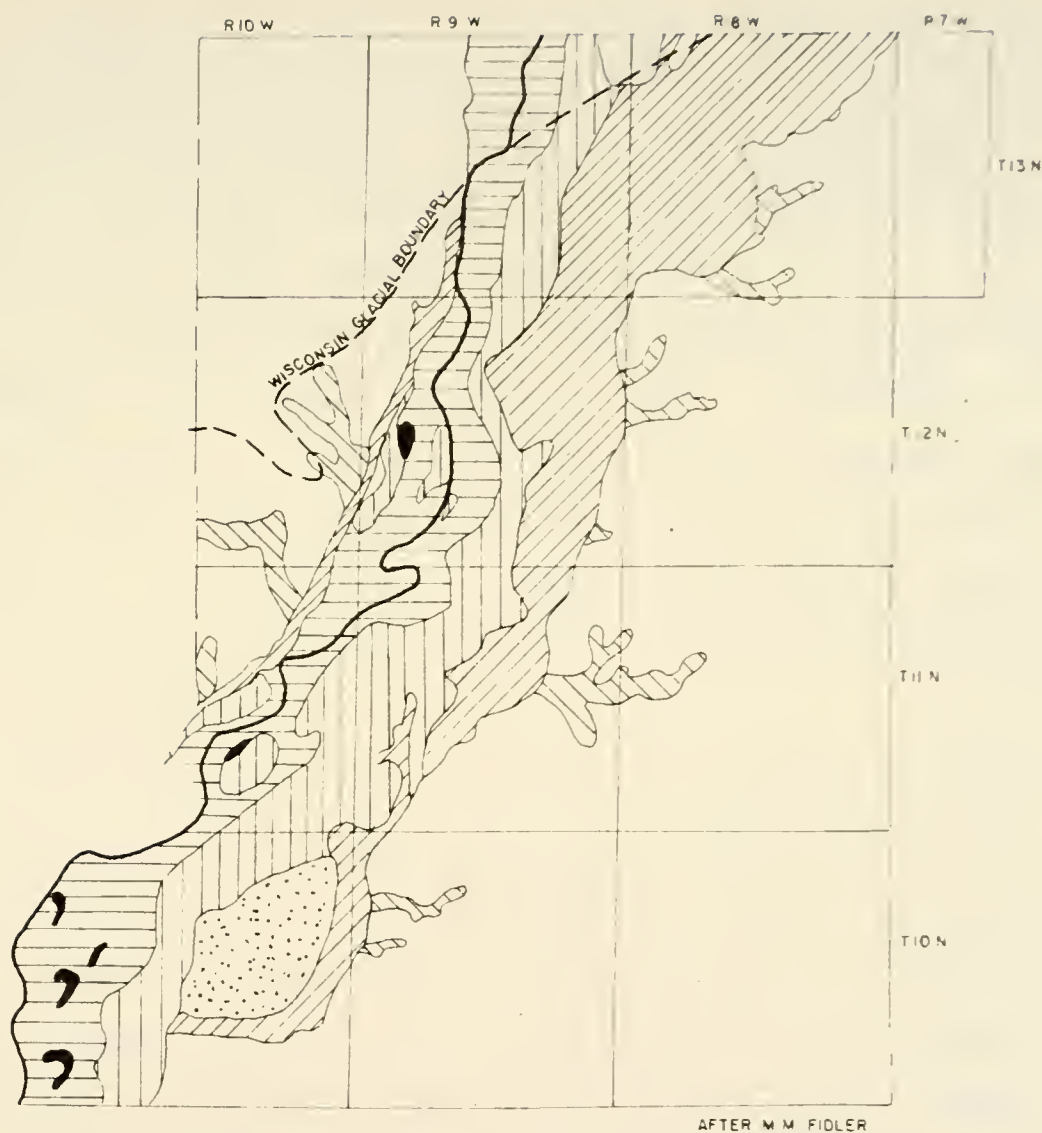


FIG. 6 TOPOGRAPHIC MAP OF VIGO COUNTY





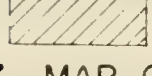
- | | |
|---|---|
|  | RIVER AND PONDS |
|  | VALLEY BRAID CORE |
|  | PRESENT FLOOD PLAIN |
|  | EARLY WISCONSIN LAKE SITE |
|  | MAUMEE (LAKE WISCONSIN) EROSIONAL TERRACE RELICT |
|  | SHELBYVILLE (EARLY WISCONSIN) ALLUVIAL TERRACE RELICT |

FIG.7 MAP OF PHYSIOGRAPHIC FEATURE OF THE LOWER WABASH RIVER VALLEY REGION.

The wide flat bottoms of the valleys reveals the slack-water conditions of development associated with the Wisconsin Lake Site shown in Figure 7. Slightly higher slackwater terraces are found in Otter Creek. Rock benches are common in Sugar Creek, Clear Creek and Hawk Creek.

On the southeastern corner, lies a flat to nearly level lacustrine plain drained by Splunge Creek. A few hills are located about two to three miles west of this lacustrine plain. In fact, the highest elevation of the county, 670 ft., is located on two of these hills. Yaw Hill is located in the NE 1/4 of sec. 18 and the other lies in sec. 20 of T10N R8W, 2nd Principal Meridian.

Maximum local relief of about 130 ft. is found on the western bluff of the Wabash River about one mile south of Shepardsville. Relief of the magnitude of 80 to 100 ft. is common along the tributaries on the west side of the Wabash River, especially along Coal Creek, Sugar Creek and Clear Creek. The lowest elevation, 440 ft., occurs on the flood plain near the border line with Sullivan County.

Strip minings on the eastern part of the county add unusual landscape to the region. The reforested strip piles with intervening lakes and ponds are sometimes pleasing to look at. However, the relatively new ones with the ridge and valley waste piles give the area a desolate look. Many basins occur within the underground mining area especially on the northeastern quarter of the county (Figure 8). The basins are the result of the collapsing roof of the mining chamber. Most of the new holes are 5 to 30 feet in diameter



FIG. 8. AERIAL PHOTOGRAPHS SHOWING BASIN FEATURE
IN THE UNDERGROUND MINING AREA

and have dropped vertically five to ten feet below the original surface.

Geology

Except for the northwestern corner which was covered by Wisconsin drift the rest of Vigo County was blanketed mainly by Illinoian glacial drift. The region along the Wabash River Valley are glacial-fluvial and fluvial deposits. A narrow strip of thick eolian deposits occurs on the east bank of the Wabash (Figure 9).

The thickness of glacial boulder clay varies from nothing to about 150 feet with an average of 25 feet estimated by Frank Leverett (9). The glacial-fluvial deposits along the Wabash Valley reach a depth of about 125 feet in many places. The variation of the depth to the bedrock surface as shown in Figure 4 reveals the buried preglacial valley.

The Wisconsin drift region consists of ground moraine and end or ridge moraine. The moraines in Vigo County belong to the Shelbyville morainic system of the early Wisconsin drift (Figure 10). It lies along the outer border of the Wisconsin drift.

In the Wabash River Valley and its major tributaries thick valley train deposits in the form of terrace and flood plain are present.

The entire county is blanketed by various depths of wind-blown deposits. The windblown sand deposits are confined along the eastern bluff of the Wabash River and along the broad Raccoon sluiceway and its southeastern bluff. The depth of

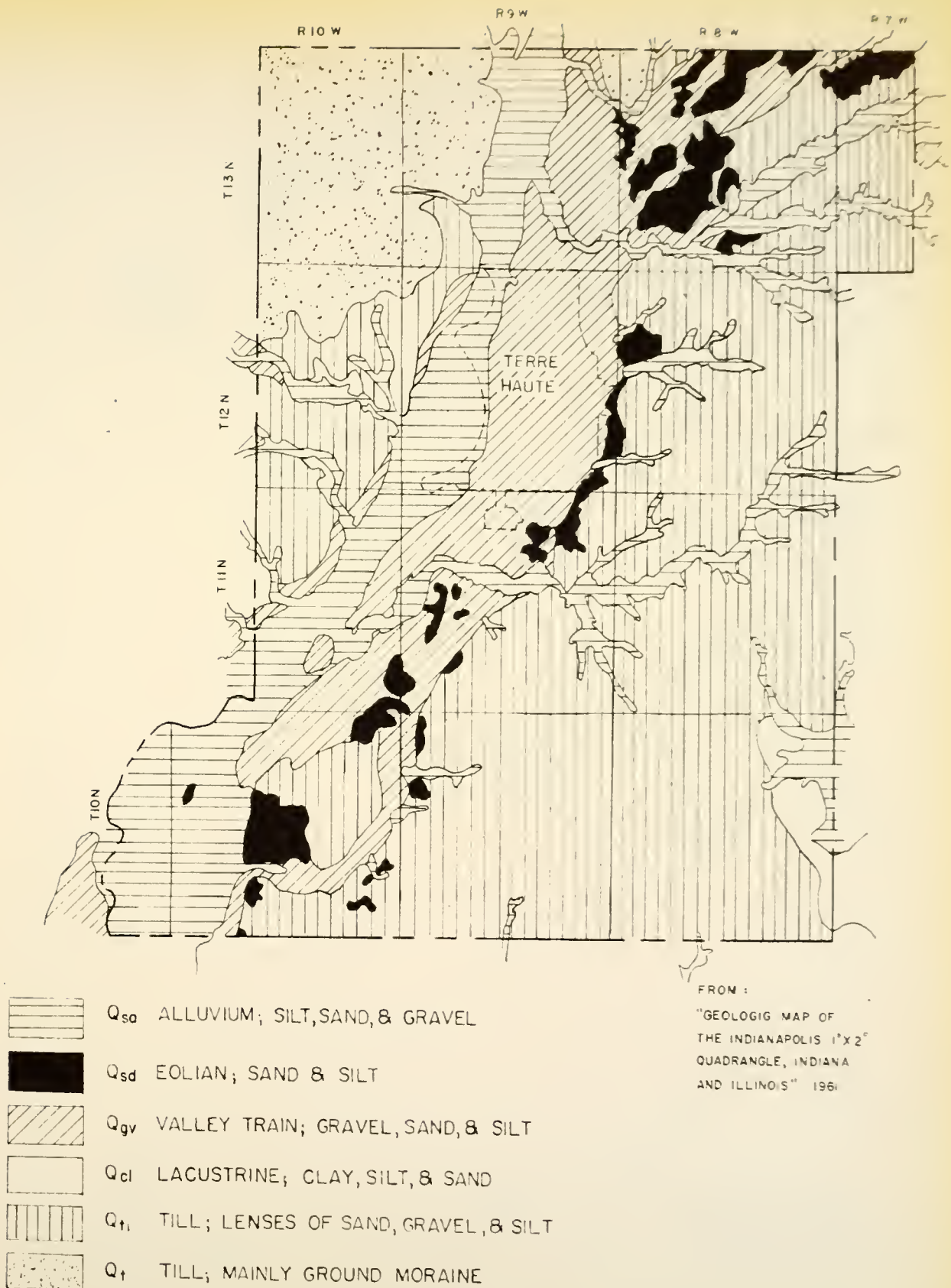


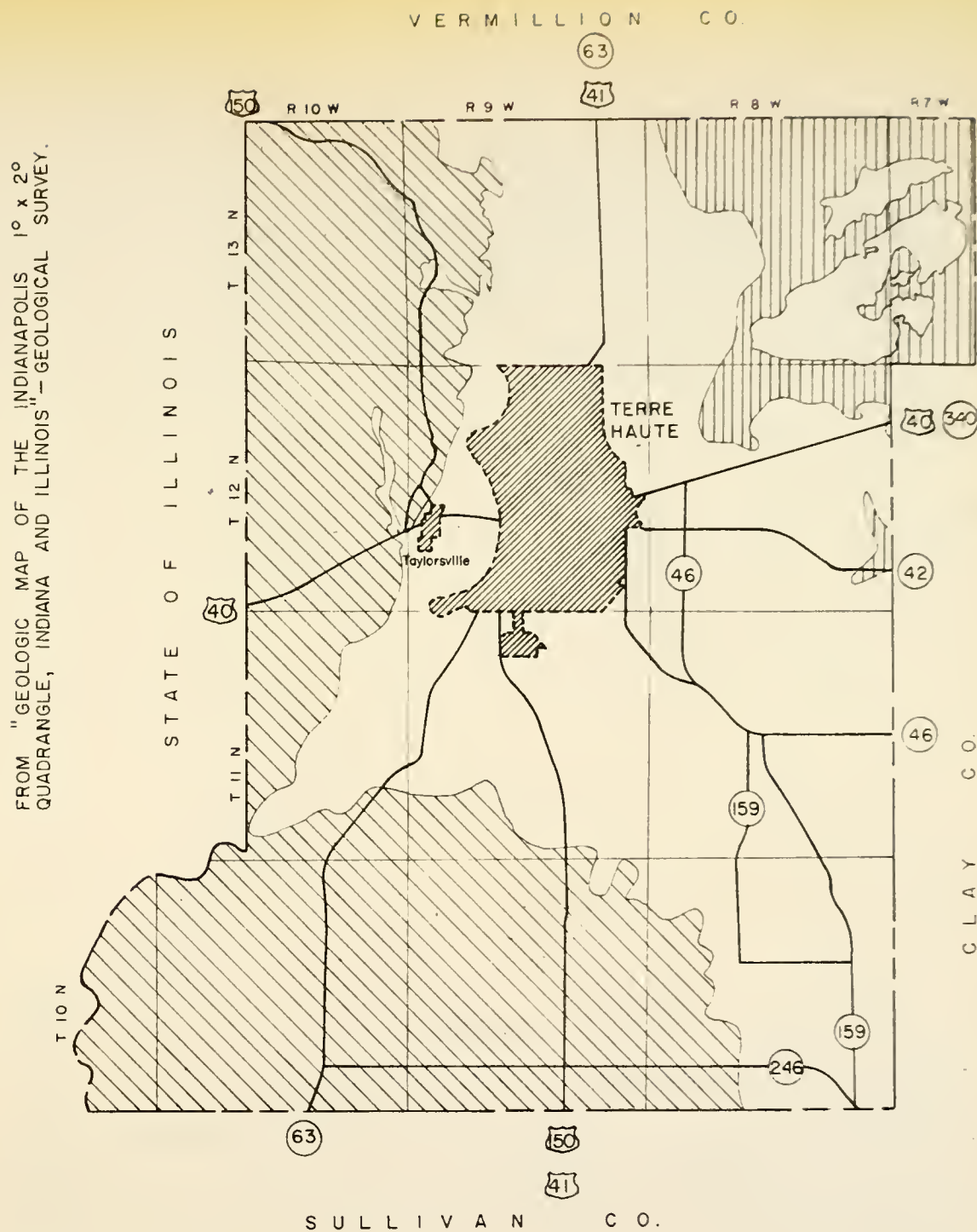
FIG. 9 SURFACIAL GEOLOGIC MAP OF VIGO COUNTY.

these windblown sand deposits may be up to 30 feet (6). The rest of the county is covered by windblown loess of varying thickness. The maximum thickness (over 200 inches) of loess occurs at the eastern bluff of the Wabash River northeast of Terre Haute. The thickness of the loess diminishes rapidly as the distance increases from the river.

The bedrock strata beneath the glacial material in Vigo County belongs to the Pennsylvanian period. The Alleghany series occupies the eastern half while the Conemaugh series underlies the western portion. The oldest formation, Raccoon Creek Group lies on the northeastern corner of the county. The Carbondale Group occupies the central and eastern portion and the youngest McLeansboro Group is situated along the western part of the county (Figure 11). Strip mines are concentrated in the Carbondale Group, i.e., the central and eastern part of the county.

Numerous rock exposures occur along the bluffs of the major rivers and streams within the county (Figure 12). They cannot be mapped as residual soil areas because of scale limitation. Of course, rocks also are exposed in the strip mine areas.

The upper most rock stratum in Vigo County is a thick bed of bluish shale which outcrops along Coal Creek and its branches in sections 14, 15, and 23 T13N, R10W, and along West Little Sugar Creek in sections 9, 10, and 15 T12N, R10W. Scovell reported that the shale cliffs varies from 20 to 40 feet in height (10). A thin layer (6") of limestone is found below the thick shale and overlies a thin shale and coal seam.



SCALE: 1/250,000

-  CARBONDALE GROUP — PENNSYLVANIAN
-  McLEANSBORO GROUP, lower part — PENNSYLVANIAN
-  RACCOON CREEK GROUP — PENNSYLVANIAN

FIG. 11 GEOLOGIC MAP OF VIGO COUNTY

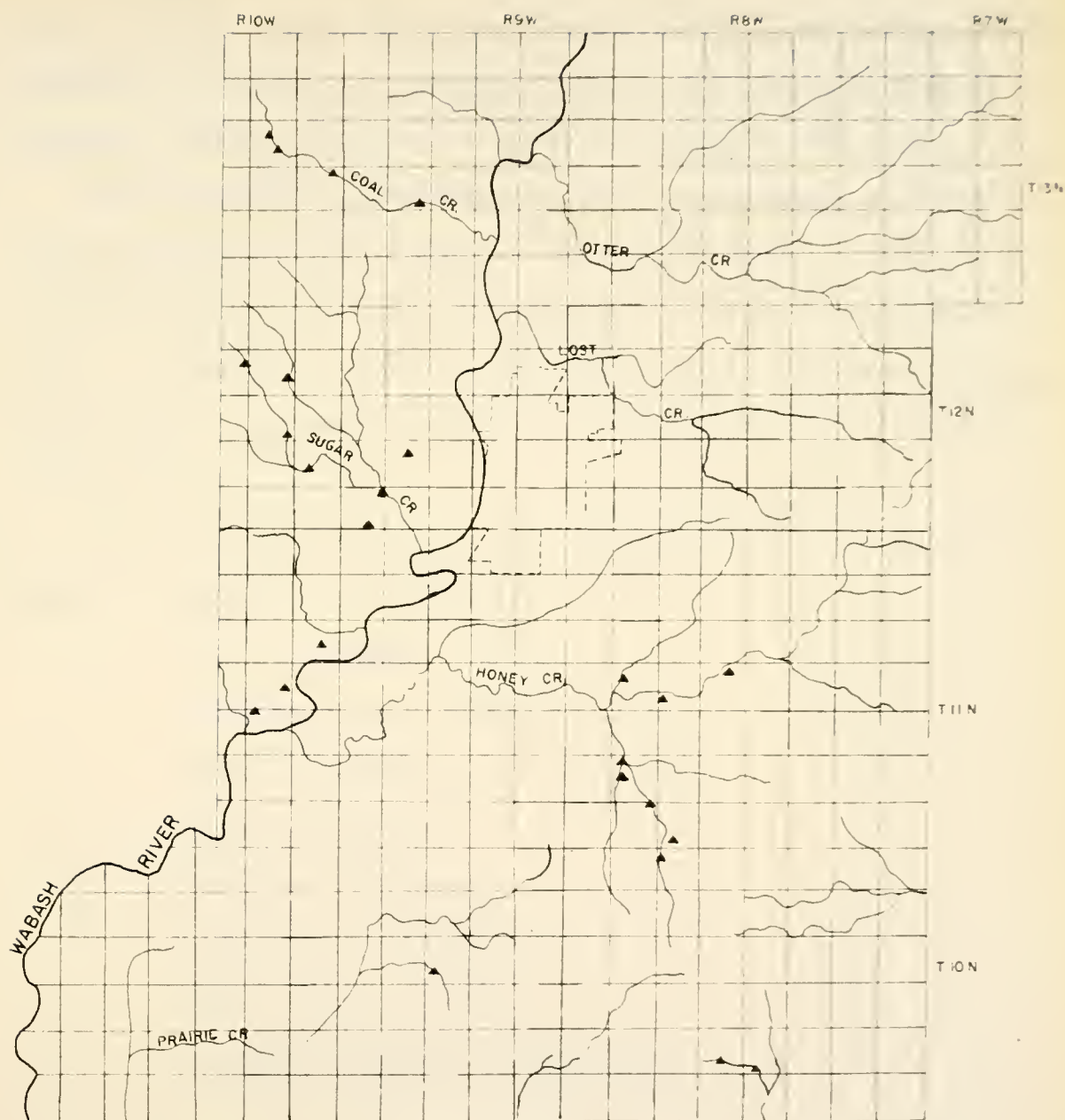


FIG. 12 LOCATION MAP OF ROCK EXPOSURE IN VIGO COUNTY, INDIANA.

Shale overlying coal outcrops in the cliff along the south bank of Honey Creek for a distance of about four miles (10,11). Exposure of shale and limestone occurs along the branch of Prairie Creek in sections 17, 16 and 15 T10N, R9W (10).

Rock outcrops also occur in the lower course of Clear Creek and the western bluff of the Wabash River. Many shale pits along the bluff are now abandoned by the tile producers (11). A limestone shelf is exposed for some distance along the bottom of the western bluff of the Wabash River south of Sugar Creek (12).

The generalized section of the region revealed by drill holes is shown as follows (10):

Soil and subsoil clay	10 ft.
Sandstone with bands of shale	30 ft.
Shale, sometimes with ironstones	20 ft.
Coal VII (1'-6')	4 ft.
Fireclay and shale	3 ft.
Sandstone, variable	10 ft.
Shale, dark colored	2 ft.
Limestone, fossiliferous hard (3 to 6 ft.)	4 ft.
Shale, black, bituminous, slaty (4 to 6 ft.)	5 ft.
Coal V (1 ft. to 6 ft.)	4 ft.
Fireclay and shale	40 ft.
Sandstone hard rock	53 ft.
Coal and shale bands	<u>7 ft.</u>
	192 ft.

LAND FORM AND ENGINEERING SOIL AREAS

The engineering soils in Vigo County are derived mainly from unconsolidated materials. The unconsolidated materials include glacial deposits, glacial-fluvial deposits, alluvial deposits, eolian deposits and cumulose deposits. A very limited area may be considered as residual soil or non-soil area. However, due to the scale limitation many narrow strips of rock or residual soil area cannot be shown on the attached map. The reader should refer to Figure 12 for their location. In the strip mining areas the waste piles as indicated on the map should be considered as non-soil areas.

Since the deposits of transported materials are far from homogeneous, variation should be expected. General properties and profile of the soil for each area of different land form are presented in this report.

Glacial Deposited Materials

Essentially all the soils of Vigo County are of glacial origin. The major portion of the county is covered by glacial deposits of Illinoian Age. Owing to the long period of weathering and erosion the end or ridge moraine of Illinoian age is no longer visible or only a small number of remnants remain. The Wisconsin drifts are comparatively young. The end moraine and ground moraine are easily identified. The entire glacial deposits, however, are covered by windblown sands and silts with a depth varying from 40 inches up to 30 feet or more. The soil derived from more than six feet of sands and loess will be considered as windblown deposits and discussed separately.

1. Ridge Moraine of Illinoian Age with Loess Mantle (5 to 6 feet)

About ten isolated mounds or ridges can be recognized in the southeastern corner of Vigo County. The mounds or hills are smooth but much higher (from 20 to 50 feet) than the surrounding flat land.

The erosional features of the mounds are essentially the same as the surrounding areas and so are the soil profiles. The surface soil has a silt loam to silty clay loam texture. The B-horizon contains more clayey materials and is classified as a silty clay to clay. The leached Illinoian till is found below the solum derived from the loess mantle, and the calcareous Illinoian till varies in texture from loam to clay and occurs below a depth of 42 inches.

2. Ridge Moraine of Wisconsin Age with Loess Mantle (20 to 40 feet)

A ridge moraine deposit of Wisconsin age is recognized in the northwestern corner of Vigo County. It exhibits a rolling to undulating topography contrasting with the surrounding nearly flat ground moraine. This is the Shelbyville moraine, the oldest morainic formation, of the early Wisconsin Age (Figure 10). The drainage and erosional pattern of this area also help to delineate this deposit from the Illinoian drift deposits.

The soil of this deposit is developed under the influence of a thin mantle of loess (20 to 40 inches). The texture of the A-horizon ranges from silt loam (ML or A-4) to silty clay loam in the high position to a silty clay (CL or A-6) or clay at low position. The B-horizon varies from a silty clay loam

to clay (CL or A-7). The parent material has a texture of either a silt loam, silty clay loam or clay loam (CL or A-6).

3. Ground Moraine of Wisconsin Age with Thin Loess Mantle
(less than 40 inches)

There are about ten square miles of area at the northwestern corner of the county that can be classified as ground moraine of the Wisconsin age. The region is covered by a thin mantle of loess (less than 40 inches). The area has a flat topography and a typical ground moraine airphoto pattern. Surface drainage is absent or poorly developed (See Figure 3). The mottled dark overall tone on the airphoto indicate the area has been influenced by prairie vegetation.

The soil is developed from a medium textured till under the influence of thin loess cover and prairie vegetation. It consists of an organic silt loam to an organic clay surface soil (A-4 to A-6, ML to CL), and a silty clay to clay subsurface soil (A-6 to A-7, CL to CH). The parent material varies from a loam to clay (A-4 to A-6, ML to CL).

4. Ground Moraine of Illinoian Age Thin Loess Mantle (about
3 to 5 feet)

Ground moraine deposits of the Illinoian Age with a loess mantle less than six feet are located in the southeastern corner of Vigo County and also west of the Wabash River valley. Narrow strips along the valley walls in the thick loess region can be considered under this category because they are exposed by erosion. However, the limitation of the map scale prevents the detail delineation of these deposits.

The topography of this ground moraine varies from nearly level to slightly undulating. Gullies along the major stream are deeply incised into the upland giving the area a rugged look. The white fringe along the dark-centered gullies and phantom drainage are typical airphoto patterns of this area.

The upper horizon of the solum is derived from the loess material. The thickness of the loess cover depends greatly on the topography and the distance from the river. On steep slopes where erosion is severe, the loess covering may have been removed.

The soil profile shows that the A-horizon is a silt loam or silty clay loam (CL or A-4). Silty clay or clay (CL to CH or A-7) soils are encountered in the B-horizon. A leached parent material is found with a texture from a silt loam to loam (CL, A-6).

Boring data along Interstate I-70 reveal some of the characteristics of the thin loess covered Illinoian drift deposits. (See Appendix B). East of station 737+00 (#20 on the attached map) the loess cover seems to be thinner as a result of erosion of the loess where located close to the drainage channels. The typical soil profile may be considered at Station 866+00 (#55 on the map). It has a silty clay loam (A-4) A-horizon which contains 17% of sand, 62% of silt and 21% of clay. The B-horizon (taken from 0.8 to 2.2 ft.) is a silty clay (A-7-6) which has 3% of sand, 54% of silt and 43% of clay. The parent material is a silty clay (A-6) in texture which consists of 4% of sand, 50% of silt and 36% of clay. Sample taken from 4.5 to 6.0 feet shows a typical

(A-4) clay loam Illinoian till parent material with a composition of 27% of sand, 45% of silt and 28% of clay.

Test sites No. 1 and No. 3 are located on steep slopes of the valley wall where the loess mantle has been removed by erosion. These soil profiles may be considered as developed from the Illinoian till.

EOLIAN DEPOSITED MATERIALS

There are extensive eolian (wind) deposits in Vigo County. The eolian deposits are subdivided into two groups: sand deposits and loess deposits.

1. Windblown Sand Deposits

Considerable amount of lands in Vigo County are covered by a thick mantle of windblown sand. Owing to the north-western prevailing wind, the sand deposits are confined to the east side of the Wabash River. According to their different depositional forms, the windblown sands are subdivided into three groups namely: sand dune deposits, sandy plain deposits and windblown sand deposits on terrace.

(A) Sand Dune

Numerous sand dunes are recognized east of the Wabash River. They are scattered on the flood plains, the terraces, the valley walls and the uplands. Most of them, however, are concentrated along a narrow belt on the upland east of Prairie Creek and on the west portion of the valley braid core between the Wabash River and Prairie Creek. A number of oriented dunes occur on the upland southeast of the board Raccoon sluiceway in the northeastern corner of Vigo County.

The sand dunes in Vigo County vary in shape from a simple mound to a series of ridges. The relief of the dunes also varies from a few feet up to 30 feet (6). Dune accumulation has caused drainage derangement at the upstream end of the high level fluvial (mapped as slackwater terrace) now occupied by Prairie Creek.

Although the materials of the sand dunes are predominantly fine uniform windblown sands, considerable amount of silt and clay particles were also blown and mixed with the fine sands. The surface soils are usually fine sandy loam or loamy fine sands. Sandy clay loam or clayey sand are the soil texture in the B-horizon. Sand banded with loamy fine sand usually occurs before the fine sand strata is reached. Test site No. 3 (appendix A) is located on a low dune. It is classified as A-2-4(o) soil throughout the entire profile by the AASHTO classification. However, by the Unified Classification the surface soil is classified as SC, the subsurface soil SM and the parent material SW-SM.

(B) Windblown Sandy Plain Deposits

The sandy plain deposits occur on the eastern bluff of the Wabash River. The continuity of the strip of the sandy plain is broken (with a gap of six miles) east of Terre Haute. These sandy plain deposits have an undulating topography. It is a little more rugged than the smooth thin loess plain to the east. Essentially they may be considered as the transitional zone between a sandy deposit and a loess deposit.

A great deal of silt and clay has been mixed in the sand deposit. The surface soils vary from sand to loam (A-4, SM or SL) in texture. The B-horizon is extremely hard when dry. It contains a high percentage of clay (about 30%) as illustrated in test site No. 2 and No. 7 (Appendix A) and is classified as a A-4 to A-6 or CL soil. The parent material is a fine sand (A-2-4 or SM).

(C) Windblown Sand on Terrace

Small areas near the place where Prairie Creek enters the Wabash River flood plain and areas near Burnett are considered as windblown sand deposits on terrace. Undoubtedly some small areas on the terrace with thin windblown sand deposit can be included in this category.

The deposits have a humocky topography. The deposit obliterates the characteristics of the underlying terrace. In places it is difficult to delineate the boundary of the underlying materials.

The deposit contains less silt than those of the sandy plain in the upland. The lower portion is a mixture of wind and water deposited sand. The soil profile consists of a sandy loam to sand surface soil, and sand with discontinuous bands of fine sandy loam subsurface soil and then fine sand as parent material.

2. Loess Plain Deposits

More than one half of the upland located east of the Wabash River is considered as loess plain deposits. The thick loess deposit is about five miles in width. The loess

is underlain by Illinoian drift followed by the sandstone-shale of the Coal Measures. The loess area in Indiana has been mapped previously by Moulthrop on a regional basis (15). Some minor changes or refinements have been made for this county engineering soils map.

The topography of the loess plain varies from rolling on the edge of the bluff to undulating toward the east. The depth of loess varies from a maximum of about 20 feet at the bluff of the Wabash River just east of Terze Haute to about six feet toward the eastern border line. As mentioned in the preceding section, the reader should be aware that on the steep slopes of the valley walls a thinner deposit or a lack of loess covering may exist because of erosion.

The soil profile of the loess deposit has a silt loam or silty clay loam A-horizon (A-4 or A-6, ML-CL). The B-horizon is a more plastic silty clay to clay soil (A-7-6 or CL to CH soil). The C-horizon ranges from silt loam to silty clay loam (A-6 to A-7-6 or a CL soil) (See 13 and 14).

The soil boring data along Interstate I-70 included in Appendix B in this report also confirm the above soil classifications. At station 722+00 (#18 on the map) the data shows a typical loess soil profile: the silty clay loam (A-6) A-horizon contains 8% of sand, 70% of silt and 22% of clay. The silty clay (A-7-6) B-horizon has 2% of sand, 59% of silt and 39% of clay. The amount of silt increased to 75% and the clay decreased to 24% in the C-horizon which is classified as silty clay loam (A-6) soil.

FLUVIAL DEPOSITED MATERIALS

About one third of Vigo County is covered by fluvial deposited materials. Three different land forms created by the action of water, namely, terrace, flood plain and lacustrine plain are discussed as follows:

1. Terraces

The terrace deposits are an outstanding feature in Vigo County. The terrace along the east bank of the Wabash River is about three miles in width stretched continuously for 20 miles from the northern border of the county toward the southwest. Two different levels of terraces occur in the Wabash Valley. The high terrace stands at 75 feet above the Wabash River level at the north and diminishes in height toward the southwest and finally merges with the flood plain near Hutton. The lower terrace is about 30 feet below the level of the high terrace. The terraces on the western bank of the Wabash River are narrow and low. In many places the underlying bedrock is exposed near the surface creating a bench.

Along Otter Creek a terrace remnant is recognized near its mouth. Slackwater terraces occur further upstream.

The Shelbyville terrace level occupies lower Prairie Creek Valley (6). It is considered as a slackwater terrace in this report.

The material of the terrace deposits is different from place to place. The deposits therefore are subdivided according to texture into the gravelly textured terrace and the sandy textured terrace.

(A) Gravelly-Textured Terraces

The major portion of the terraces in Vigo County have a gravelly texture. The coarse deposit was due to its proximity to the Shelbyville moraine where the melt waters retained high velocity. The heavy coarse materials were deposited in regions immediately adjacent to the border of the terminal moraine and the finer textured materials were deposited further away from the moraine.

Infiltration basins and current scars are the airphoto indicators of these coarse deposits. The surface texture of this deposit varies widely from sand to a silty clay loam (A-2-4). The B-horizon contains a little more clayey material and becomes slightly more plastic than the surface soil. Stratified sand and gravel may be found at a depth from two to three feet below the surface. The composition of the parent material may range from 20 to 50 percent gravel, 30 to 80 percent sand and 0 to 10 percent clay.

(B) Sandy-Textured Terraces

The sandy textured terrace is generally located near the edge of the terrace where melt water velocities are smaller than those near the midstream. Also it is deposited further away from the source of the outwash. It is a continuous narrow belt from the ancient Raccoon Valley southwestwardly to the point near Hutton.

The topography of the sandy-textured terrace are smoother than the gravelly textured terrace deposits. Infiltration basins and current scars are almost absent from this deposit.

The surface texture of the sandy textured terrace is generally a sandy loam or loam. However, in the lower position silty clay loam to silty clay soil are usually present. The subsurface soil contains more clayey material and become more plastic. The parent material is stratified sand with some gravel and silt strata. The general composition ranges from 0 to 30 percent gravel, 60 to 95 percent sand and 0 to 30 percent of fines.

2. Slackwater Terraces

A few terraces along Otter Creek and Prairie Creek are considered as slackwater terrace. The terraces in the valley of Otter Creek are just a few feet above their adjacent flood plain, and in time of high water they are inundated. The terrace is smooth and nearly level in topography. No infiltration basin occur on this deposit. The slackwater terrace along Prairie Creek is extremely level except near the southern end where windblown sand deposits covered the terrace to a great extent.

The composition of this deposit is essentially silty and sandy. The surface soil ranges from a silt loam to a silty clay loam and the subsurface soil varies from a clay loam to a clay. The parent material for the terraces along Otter Creek is stratified silty clay loam, loam, silt and fine sand. More coarser parent material consists of stratified silt and sand with some silt and gravel are found in the slackwater terrace along Prairie Creek.

3. Thin Terrace Deposits on Rock Benches

On the west bank of the Wabash River Valley the narrow strip of terrace extended from a point west of East Terre Haute to Illinois state line is recognized as a thin terrace deposit on bedrock. The land form is a bench.

The topography of the thin terrace on bedrock is very gently undulating. Infiltration basins and current markings are lacking on this terrace deposit because of its shallowness.

The surface soils are essentially developed from terrace deposits. They vary from a sandy loam to a silty clay loam in texture. The subsurface soils range from a sandy loam to clay. The interbedded shale and sandstone may be encountered below a depth of about two feet. On the southern portion of this region a limestone rock shelf is found beneath the terrace deposit.

Many shale pits were opened on the northern part of this terrace strip (11).

4. Organic Terrace Deposits

At the upper end of the Prairie Creek slackwater terrace deposit there is an area (about 1.5 square miles) considered as organic terrace deposit. The area is situated in a lower topographic position and has a dark photo tone. Ditches were dug in this area to facilitate the removal of sluggish surface waters.

The surface soil contains a considerable amount of organic matter. It varies from an organic silt loam to an organic silty clay loam in texture. The subsurface soils are more clayey in texture (from clay loam to clay). The parent material is a stratified sand and silt with some clay and gravel.

5. Lacustrine Plains

An area about five square miles in size located near the southeastern corner of Vigo County is considered as a lacustrine plain deposits. This lacustrine plain is relatively flat but slopes very gently toward the Splunge Creek Valley. The slight surface irregularity may be due to the unevenness of the windblown silt deposits that overlie the area.

The soil is chiefly the reworked silt loam of the upland type developed under the influence of prairie vegetation. The surface soil ranges from an ash gray to white colored silty clay loam to clay. The subsoil is a very tenacious silty clay or clay (gray to white in color). The parent material is composed of clay or silty clay with some silt or fine sand layers.

6. Flood Plains

Vigo County has a relatively large amount of flood plains along the rivers and streams. The extent of mapping of these plains was determined by the scale of the engineering soils map.

Due to the different sources of the alluvial materials in the flood plains, they have two different textures namely, sandy textured and silty textured flood plains.

(A) Sandy-Textured Flood Plain Deposits

The sandy textured flood plains are mainly confined in the Wabash River valley. The flood plain varies in width from less than one mile to more than three miles near the south tip of the county. Current scars and natural levees are numerous along the Wabash flood plains. Many swampy depressions are also found within this flood plain. Sandy textured alluvium in fans also occurs along the gullies or the streams close to the uplands.

The texture of the flood plain deposits varies greatly both laterally and vertically from one place to the other. Coarse-textured deposits are generally located along the natural levees. Finer textured deposits occur in the depressions and the slackwater region near the edges of the uplands.

Surface soils are most often sandy loam, silt loam or clay loam. The subsurface soil is slightly more clayey in texture. The parent material is a stratified sandy loam, silty clay loam or silt loam.

(B) Silty-Textured Flood Plain Deposits

The larger tributaries of the Wabash River such as Sugar Creek, Otter Creek and Honey Creek all have oversized flood plains. The soils are derived from the material of the surrounding loess covered uplands.

The surface soil is generally a silty clay loam, and the subsoil is silt clay in texture. Boring data of I-70 from station 788+00 (No. 33 on map) taken 42 feet left of the centerline on the flood plain of Honey Creek shows a silty clay loam (A-4) surface layer (0 to 2.2 feet) and a silty clay (A-6 to A-7) soil from 4.5 feet down to 12 feet. The bore hole taken 42 feet right of the centerline (close to Honey Creek) is much more sandy in texture. This illustrates the variability of the alluvial deposit. For more detailed study the reader should refer to the soil profiles given in the Report of Highway Soil Investigation of I-70 in Vigo County (16).

7. Shallow Slackwater Deposits Over Rock Benches

There are a number of terrace remnant like land forms along Sugar Creek and Clear Creek. They have a plane surface but undulating topography prevails because of erosion. They occupy a position between the flood plain on one side and the upland on the other. The deposit slopes gradually toward the upland. Since the stream valleys were ponded during the Wisconsin glacial period, lacustrine or slackwater deposits were developed (see Figure 7 and Figure 9). Erosion following the glaciation removed most of the lake bed deposits except those that may be protected by the underlying bedrock benches. Therefore these deposits are considered shallow slackwater deposits over rock benches.

The soil developed on the slackwater deposit and the alluvial deposit may have been washed in from the adjacent uplands. The surface soil varies from a silt loam to clay. The subsurface soils are much more clayey. A gravelly clay loam or sandy clay soil layer is usually found before the interbedded sandstone and shale strata is reached.

CUMULOSE MATERIALS

Accumulation of cumulose or organic materials occur frequently in basins on various land forms. The most frequently occurring cumulose deposits occupy basins or depressions in the alluvial plain and on the terrace. They are mapped as highly organic topsoil depressions. The groundwater table is high in these areas.

The soil profile consists of a highly organic silty clay or clay topsoil, a plastic silty clay or clayey subsoil and a stratified silt loam, silty clay loam, sandy loam or a stratified sand, silt and gravel substratum depending on the region where the deposit is located.

MISCELLANEOUS

Swamp

On the Wabash River flood plain there are two areas that are swamps. One is located south of West Terre Haute. The other occurs near the south border of the county. The soil profile is essentially the same as the low profile of the silty textured alluvial deposit. They are subject to flooding most of the time because of low topographic position. The area is under forest cover.

Strip Mines

In the central and eastern part of the county there are numerous coal strip mines. Both the pit and the spoil material area are included in the strip mine area on the attached engineering soil map. The spoil was most frequently dumped in elongated piles and consists of a heterogeneous mixture of soil materials, sandstone boulders and slabs, shale slabs and some coal. Some of the older spoil has been reforested. Some pits contain water as indicated on the map.

The boundary of the strip mine is based on the 1939 airphoto and the available topographic maps. Some of the stripping has been subsequently widened and some new sites have also been opened. Field investigation of this area is required.

Underground Mine

A number of underground mine operations were sighted on the 1939 airphoto in the northeastern quarter of Vigo County. They are indicated also on the attached engineering soils map. Due to the collapse of the underground chambers as mentioned previously a number of basins developed on the surface (see Figure 8). The engineers should investigate the location of the underground mining area before the design of important structures.

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Standard
Laboratory
Compaction
(AASHTO T99)

Site No.	O.M.C. %	Max. Dry Weight %	Unified Classi- fication	AASHTO Classi- fication
1	15	115	ML	A-4 (4)
	11	127	SC	A-4 (2)
	11	127	SM-SC	A-4 (2)
2	12	122	SM	A-4 (0)
	16	112	CL	A-6 (8)
	14	117	SM	A-2-4 (0)
3	15	114	CL	A-4 (7)
	12	121	SC	A-6 (3)
	12	123	SM-SC	A-4 (2)
4	21	101	CL-ML	A-4 (8)
	24	96	CL	A-7-6 (14)
	14	117	SC	A-4 (1)
5	22	99	CL	A-7-6 (14)
	11	124	ML-CL	A-4 (3)
6	14	115	SM-SC	A-2-4 (0)
	15	115	SC	A-2-4 (0)
	22	100	SM-SW	A-1-b (0)
7	13	120	ML	A-4 (3)
	17	109	CL	A-4 (5)
	14	117	SM	A-2-4 (0)
8	13	119	SC	A-2-4 (0)
	13	118	SM	A-2-4 (0)
	15	114	SW-SM	A-2-4 (0)

APPENDIX A

SOIL TEST DATA FOR VIGO COUNTY

Site No.	Horizon	Depth, Ft.	Grain Size Distribution						Liquid Limit %	Plastic Index %	Standard Laboratory Compaction (AASHTO T99)		Unified Classification	AASHTO Classification
			Gravel Greater than #4 %	Fine Gravel #4-#10 %	Coarse Sand #10-#40 %	Fine Sand #40-#200 %	Silt #200-0.005mm %	Clay Less Than 0.005mm %			O.M.C. %	Max. Dry Weight %		
1	A ₂₁	0.17-0.58	1	0	6	40	34	19	18	NP	15	115	ML	A-4(4)
	B _{22t}	2.42-3.50	4	1	11	37	14	33	25	9	11	127	SC	A-4(2)
	C	4.33-5.33	3	3	8	40	18	28	19	6	11	127	SM-SC	A-4(2)
2	A _p	0.00-0.67	0	0	4	60	22	14	--	NP	12	122	SM	A-4(0)
	B _{21t}	0.92-2.17	0	0	4	37	23	36	35	17	16	112	CL	A-6(8)
	C	5.00-7.33	0	0	7	75	3	15	--	NP	14	117	SM	A-2-4(0)
3	A ₂	0.08-0.92	2	0	7	23	47	21	19	NP	15	114	CL	A-4(7)
	B _{22t}	2.33-3.67	2	2	12	39	10	35	28	12	12	121	SC	A-6(3)
	C	4.00-4.82	5	3	15	30	21	26	19	5	12	123	SM-SC	A-4(2)
4	A _p	0.00-0.83	0	1	6	9	60	24	30	5	21	101	CL-ML	A-4(8)
	B _{21tg}	1.08-2.33	0	0	1	1	48	50	48	22	24	96	CL	A-7-6(14)
	IIB _{3t}	3.17-4.58	3	5	12	38	18	24	23	8	14	117	SC	A-4(1)
5	B _{21t}	1.00-2.50	0	0	1	3	50	46	48	22	22	99	CL	A-7-6(14)
	IIC	4.58-5.50	3	7	15	18	33	24	21	5	11	124	ML-CL	A-4(3)
6	A _p	0.00-0.83	0	0	59	16	8	17	21	4	14	115	SM-SC	A-2-4(0)
	B _{21t}	1.67-2.83	3	7	55	15	4	16	27	8	15	115	SC	A-2-4(0)
	BC	3.75-5.00	1	1	53	32	4	9	--	NP	22	100	SM-SW	A-1-b(0)
7	A _p	0.00-0.83	0	0	2	46	31	21	--	NP	13	120	ML	A-4(3)
	B _{2tg}	1.50-3.17	0	1	3	35	26	35	25	8	17	109	CL	A-4(5)
	C	5.33-6.17	0	0	1	79	4	16	--	NP	14	117	SM	A-2-4(0)
8	A _p	0.00-0.83	0	0	5	70	7	18	--	NP	13	119	SC	A-2-4(0)
	B _{21t}	0.83-2.00	0	0	9	62	6	23	25	NP	13	118	SM	A-2-4(0)
	C	5.33-6.67	0	0	5	82	2	11	--	NP	15	114	SW-SM	A-2-4(0)

APPENDIX B

Soil boring data along I-70

The soil test data tabulated below was obtained from consultants' reports prepared for the Indiana State Highway Commission. The location of the site is shown on the attached engineering soils map. Considerable additional data is contained in the consultants' reports.

Site	Station	Offset (ft.)	Depth (ft.)	AASHO Classification	Texture	Percent				L.L.	P.I.
						Gravel	Sand	Silt	Clay		
1	626+00	42 Rt.	1.4-3.2	A-7-6(15)	Si.Cl.	0	3	59	38	48	23
			5.0-6.6	A-6(12)	Clay	1	24	42	33	40	20
2	629+00	42 Lt.	0-1.0	A-5(10)	Si.L.	0	7	76	17	49	8
			2.7-6.0	A-6(9)	Si.Cl.	0	2	67	31	40	12
3	635+00	42 Lt.	0.0-0.8	A-4(8)	Si.Cl.L.	0	8	70	22	28	4
		42 Lt.	4.0-5.0	A-6(8)	Si.Cl.	0	8	60	32	32	11
4	638+00	42 Rt.	4.0-6.0	A-6(8)	Clay	0	35	33	32	32	16
5	656+00	42 Rt.	5.0-6.0	A-6(11)	Si.Cl.L.	0	5	67	28	40	18
6	659+00	42 Lt.	0.9-2.0	A-6(8)	Si.Cl.L.	0	12	60	28	34	11
			2.0-4.2	A-7-6(15)	Si.Cl.	0	12	52	36	46	25
7	665+00	42 Lt.	0.0-1.5	A-4(8)	Si.Cl.L.	0	5	71	24	32	8
8	668+00	42 Rt.	2.2-4.5	A-7-6(15)	Clay	0	3	49	48	48	23
9	674+20	42 Rt.	4.5-6.0	A-6(11)	Clay	0	23	44	33	35	17
10	677+00	42 Lt.	1.8-4.2	A-6(10)	Si.Cl.L.	0	7	65	28	36	15
11	686+00	42 Lt.	4.3-6.0	A-6(10)	Si.Cl.	0	8	61	31	33	14

AASHO

Site	Station	Offset (ft.)	Depth (ft.)	Classifi- cation	Texture	Percent				L.L.	P.I.
						Gravel	Sand	Silt	Clay		
12	689+00	42 Lt.	0.5-2.1	A-7-6(17)	Clay	0	1	47	52	51	27
13	695+00	42 Lt.	2.1-4.1	A-7-6(12)	Si.Cl.	0	3	57	40	43	19
14	698+00	42 Lt.	0.8-2.1	A-6(8)	Si.Cl.	0	5	59	36	33	11
15	706+50	42 Rt.	0.0-0.8	A-4(8)	Si.Cl.L.	4	12	63	21	34	10
16	707+00	42 Lt.	0.4-2.5	A-7-6(18)	Si.Cl.	0	3	53	44	52	31
			2.5-4.5	A-6(9)	Si.Cl.L.	1	4	69	26	33	12
			4.5-6.0	A-6(8)	Si.Cl.L.	0	21	53	26	29	11
17	716+00	42 Lt.	2.3-4.4	A-7-6(14)	Clay	0	5	47	48	45	22
			4.4-6.0	A-7-6(15)	Si.Cl.	0	6	50	44	45	24
19	722+00	42 Rt.	0.0-1.8	A-4(8)	Si.Cl.L.	0	8	70	22	30	10
			1.8-4.0	A-7-6(16)	Si.Cl.	0	2	59	39	48	26
			4.0-6.0	A-6(9)	Si.Cl.L.	0	1	75	24	37	13
20	725+45	42 Lt.	3.8-7.0	A-4(1)	Si.Cl.L.	0	62	16	22	21	3
20	728+00	42 Lt.	1.0-2.2	A-4(8)	Si.Cl.L.	0	20	53	27	29	7
		42 Rt.	2.0-3.7	A-2-4(0)	Sa.L.	1	67	13	19	20	2
21	737+00	42 Lt.	3.0-4.5	A-6(10)	Cl.L.	0	21	50	29	36	15
22	739+55	42 Lt.	0.0-0.6	A-4(8)	Si.Cl.L.	0	7	70	23	28	5
			0.6-2.0	A-6(10)	Si.Cl.	0	1	60	39	40	14
			8.0-10.0	A-6(1)	Sa.Cl.L.	1	59	17	23	30	11

Site	Station	Offset (ft.)	Depth (ft.)	AASHO Classifi- cation	Texture	Percent					L.L.	P.I.
						Gravel	Sand	Silt	Clay			
23	740+65	42 Rt.	2.0-4.0	A-4(5)	Loam	0	41	43	16		24	5
24	749+00	42 Rt.	1.0-2.2	A-4(4)	Loam	0	44	40	16		21	5
25	750+15	42 Lt.	1.7-3.0	A-2-4(0)	Sand	1	61	9	9	N.P.	N.P.	N.P.
			4.5-6.0	A-4(1)	Sa.L.	3	58	22	17		21	6
			8.5-10.0	A-4(3)	Cl.L.	7	41	28	24		22	7
			10.0-11.0	A-4(8)	Si.L.	0	10	71	19		22	1
26	752+37	42 Lt.	1.8-4.0	A-6(10)	Cl.L.	0	27	43	30		32	15
	752+00	42 Rt.	9.0-12.0	A-7-6(12)	Clay	0	41	29	30		41	27
27	760+00	42 Rt.	0.8-2.2	A-7-6(13)	Si.Cl.	0	5	51	44		43	22
			2.2-4.0	A-6(10)	Si.Cl.	0	2	59	39		40	16
28	762+50	42 Lt.	1.0-2.6	A-7-5(20)	Clay	0	2	44	54		62	32
			2.6-4.0	A-6(9)	Si.Cl.	0	3	65	32		39	13
29	777+00	42 Lt.	0.0-0.8	A-4(8)	Si.L.	0	14	68	18		28	4
			0.8-2.5	A-4(8)	Si.Cl.L.	0	9	62	29		28	7
			4.6-6.0	A-6(10)	Clay	0	32	37	31		36	19
	42 Rt.		1.4-2.0	A-2-4(0)	Sa.L.	5	63	21	11	N.P.	N.P.	N.P.
			6.0-8.0	A-4(4)	Cl.L.	7	36	32	25		23	9
30	779+00	42 Lt.	8.0-10.0	A-6(8)	Clay	1	33	25	36		35	16
	42 Rt.		0.5-2.6	A-7-6(12)	Si.Cl.	0	1	58	41		43	18
			2.6-4.4	A-6(10)	Si.Cl.	0	2	64	34		38	14
			6.0-8.0	A-4(2)	Sa.L.	8	48	24	20		23	7
			8.0-10.5	A-6(4)	Sa.Cl.	1	50	18	31		35	14

Site	Station	Offset (ft.)	Depth (ft.)	AASHTO Classification	Texture	Percent				L.L.	P.I.
						Gravel	Sand	Silt	Clay		
31	782+00	42 Lt.	4.2-6.0	A-4(2)	Sa.L.	4	53	24	19	25	10
		42 Rt.	5.0-6.5	A-6(11)	Clay	0	29	37	34	39	20
32	784+45	42 Rt.	2.4-4.0	A-4(8)	Si.Cl.L.	0	18	59	23	27	7
			8.5-10.0	A-6(10)	Si.Cl.	0	15	51	34	35	16
33	788+00	42 Lt.	0.0-2.2	A-4(8)	Si.Cl.L.	0	17	58	25	32	10
			4.5-6.0	A-6(10)	Si.Cl.	0	16	52	32	37	16
			8.0-10.0	A-7-6(14)	Si.Cl.	0	2	53	45	45	23
			20.0-23.0	A-7-5(16)	Si.Cl.	0	9	55	36	64	19
	42 Rt.		6.0-8.0	A-4(5)	Si.L.	1	39	53	7	N.P.	N.P.
			8.0-10.0	A-2-4(0)	Sand	1	87	6	6	N.P.	N.P.
			14.0-16.0	A-4(6)	Loam	0	34	47	19	22	6
			18.0-20.0	A-6(8)	Clay	0	7	48	45	31	11
34	791+00	42 Lt.	2.2-4.0	A-4(8)	Si.L.	0	20	65	15	30	7
			6.8-7.0	A-2-4(0)	Sand	0	86	8	6	N.P.	N.P.
			23.0-27.3	A-4(4)	Cl.L.	0	47	32	21	25	7
			31.0-33.0	A-6(8)	Clay	7	26	26	41	30	15
35	794+00	42 Lt.	15.0-17.0	A-4(7)	Cl.L.	1	31	45	23	28	9
36	797+00	42 Rt.	1.3-4.0	A-4(8)	Si.Cl.L.	0	13	61	26	28	8
37	800+00	42 Lt.	0.8-2.0	A-6(14)	Si.Cl.	0	1	58	41	40	25
			5.0-7.0	A-4(6)	Cl.L.	1	36	36	27	30	9
			14.0-15.0	A-4(0)	Sa.L.	6	58	16	20	22	7
			16.5-18.0	A-6(5)	Cl.L.	5	41	27	27	26	12

Site	Station	Offset (ft.)	Depth (ft.)	AASHO Classification	Texture	Percent				L.L.	P.I.
						Gravel	Sand	Silt	Clay		
38	806+00	42 Lt.	0.0-0.8	A-4(8)	Si.Cl.L.	1	18	59	22	29	3
			0.8-2.0	A-4(5)	Cl.L.	2	36	39	23	23	5
39	808+00	42 Lt.	2.1-3.8	A-2-4(0)	Sa.Cl.L.	3	63	12	22	23	6
40	811+00	42 Lt.	4.5-6.0	A-2-4(0)	Sand	4	84	6	6	N.P.	N.P.
41	812+00	42 Rt.	4.2-6.0	A-4(0)	Sa.L.	0	63	18	19	22	5
			6.0-9.5	A-4(3)	Cl.L.	0	49	31	20	23	7
42	814+00	42 Lt.	3.0-4.5	A-4(1)	Sa.L.	1	60	28	11	N.P.	N.P.
43	817+32	42 Lt.	3.0-7.0	A-4(5)	Clay	1	37	28	34	35	9
44	821+00	42 Lt.	0.8-2.2	A-6(9)	Si.Cl.	0	15	55	30	34	12
45	824+00	42 Rt.	0.0-3.0	A-4(1)	Sa.Cl.L.	2	59	15	24	25	8
46	827+25	42 Lt.	6.5-8.6	A-2-4(0)	Sa.Cl.L.	1	69	8	27	N.P.	N.P.
47	830+00	42 Lt.	0.0-0.8	A-4(8)	Si.Cl.L.	0	11	66	23	32	6
			7.0-9.0	A-4(6)	Cl.L.	0	37	34	29	31	7
	36 Rt.		2.1-4.3	A-7-6(10)	Si.Cl.	0	1	60	39	42	14
48	832+75	42 Lt.	0.5-2.0	A-4(8)	Si.Cl.L.	1	15	61	23	33	9
			4.1-6.0	A-6(10)	Si.Cl.	0	16	52	32	35	14
49	836+00	42 Lt.	0.0-0.8	A-6(10)	Si.L.	0	20	63	17	25	14
50	845+50	42 Rt.	0.4-2.1	A-6(10)	Si.Cl.	0	4	54	42	39	15
51	850+75	35 Rt.	0.9-2.4	A-4(8)	Si.Cl.L.	0	11	62	27	25	4
			4.3-7.3	A-6(10)	Clay	0	16	48	36	34	12

<u>Site</u>	<u>Station</u>	<u>Offset (ft.)</u>	<u>Depth (ft.)</u>	<u>AASHTO Classifi- cation</u>	<u>Texture</u>	<u>Percent</u>				<u>L.L.</u>	<u>P.I.</u>
						<u>Gravel</u>	<u>Sand</u>	<u>Slit</u>	<u>Clay</u>		
52	854+00	42 Rt.	0.0-1.0	A-4(8)	sl.Cl.L.	0	12	60	28	38	8
53	860+00	42 Lt.	2.5-4.3	A-4(4)	Clay	1	43	24	32	30	10
			6.0-8.0	A-6(4)	Sa.Cl.L.	3	50	17	30	31	14
54	864+00	42 Rt.	0.0-1.5	A-6(11)	Sl.Cl.	0	2	59	39	40	17
55	876+00	42 Rt.	0.0-0.8	A-4(8)	Sl.Cl.L.	0	17	62	21	28	1
			0.8-2.2	A-7-6(12)	Sl.Cl.	0	3	54	43	42	19
			2.2-4.5	A-6(12)	Sl.Cl.	0	4	60	36	40	20
			4.5-6.0	A-4(8)	Cl.L.	0	27	45	28	28	10

APPENDIX C

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SOIL CLASSIFICATION AND PROFILE SYMBOLS

Description	Grain Size Distribution				Plastic Index	Symbol
	Gravel % Retained on #10	Sand #10-#200	Silt 0.05-0.005mm	Clay Less than 0.005mm		
Gravel	85-100	0-15	0-10	0-10	NP	
Sandy Gravel	50-85	15-50	0-10	0-10	6 Max.	
Sand	0-15	85-100	0-10	0-10	NP	
Gravelly Sand	20-49	45-85	0-10	0-10	6 Max.	
Sandy Loam	0-19	50-80	0-50	0-20	6 Max.	
Sandy Clay Loam	0-19	50-80	0-30	20-30	10 Max.	
Sandy Clay	0-19	55-70	0-15	30-45	11 Min.	
Loam	0-19	30-50	30-50	0-20	10 Max.	
Silt Loam	0-19	0-50	50-100	0-20	10 Max.	
Silty Clay Loam	0-19	0-30	70-100	20-30	11 Min.	
Silty Clay	0-19	0-15	55-70	30-45	11 Min.	
Clay Loam	0-19	20-50	50-80	20-30	11 Min.	
Clay	0-19	0-55	0-55	30-100	11 Min.	
Peat or Muck						
Limestone						
Sandstone						
Shale						
Stony Fragments						
Organic Matter						
Topsoil						

Classification of Gravelly Soils

- 85%-100% gravel plus finer material - Gravel
- 50%-84% gravel plus finer material - Clayey, silty or sandy gravel
- 20%-49% gravel plus finer material - Use fine classification and called gravelly sand, gravelly silt or gravelly clay
- 0%-19% gravel plus finer material - Use fine classification only



S U L L I V A N C O.

FARMERSBURG

ENGINEERING SOILS MAP VIGO COUNTY

INDIANA

PREPARED FROM

1939 A.A. AERIAL PHOTOGRAPHS

BY

JOINT HIGHWAY RESEARCH PROJECT

AT

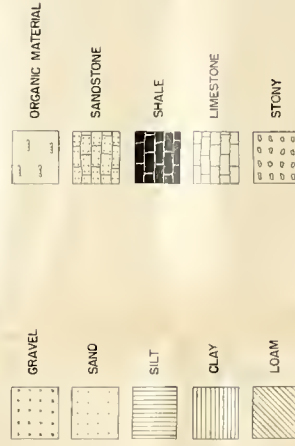
PURDUE UNIVERSITY

1971

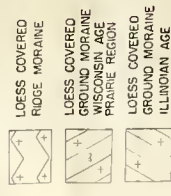
SCALE OF MILES



TEXTURAL SYMBOLS FOR SOIL PROFILES



LEGEND

PARENT MATERIALS
(GROUPED ACCORDING TO
LAND FORM AND ORIGIN)

WINDBLOWN SANDY PLAIN

SAND DUNE

TERRACE

TERRACE ON ROCK
BENCH (INTERBEDDED
SANDSTONE AND SHALE)TERRACE ON
LIMESTONE BENCHWINDBLOWN SAND
ON TERRACETERRACE ON
INTERBEDDED
SANDSTONE, SHALE
AND LIMESTONESLACK WATER
TERRACE
TERRACE OVER
ROCK BENCHES

LACUSTRINE PLAIN

FLOOD PLAIN

MISCELLANEOUS

HIGHLY ORGANIC
TOPSOIL DEPRESSION

SWAMP

LAKE OR POND

SOIL SAMPLING SITE

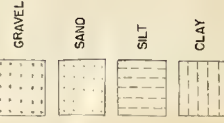
BORING SITE

STRIP MINE

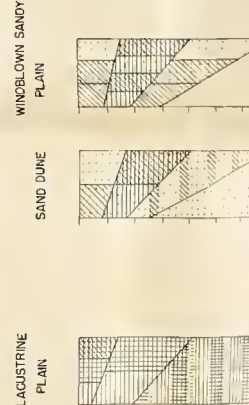
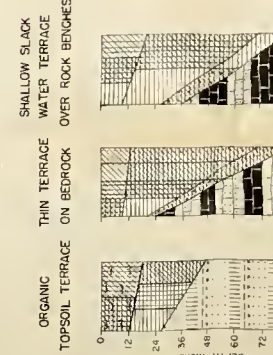
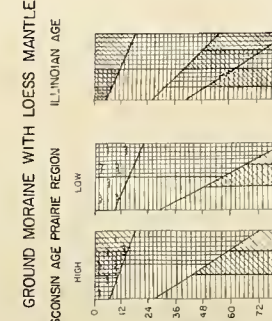
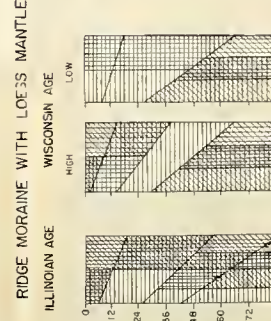
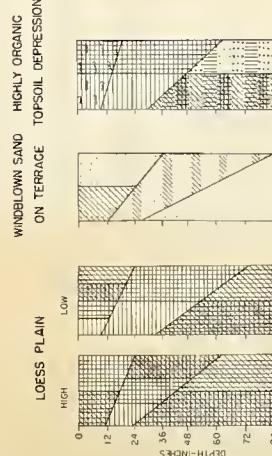
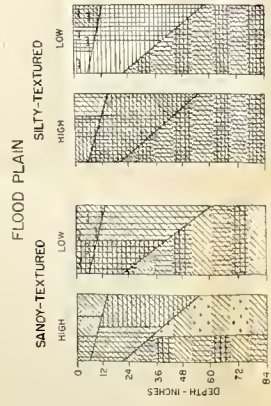
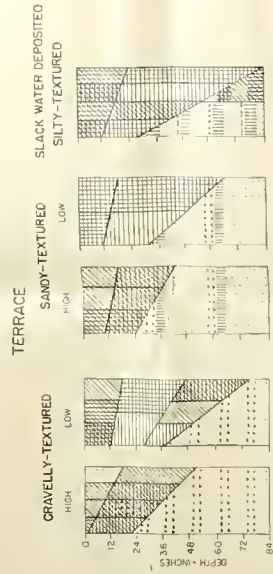
UNDERGROUND COAL MINE

GRAVEL PIT

SHALE PIT

TEXTURAL SYMBOLS
(SUPERIMPOSED ON PARENT MATERIAL
TO SHOW RELATIVE COMPOSITION)

GENERAL SOIL PROFILES



V E R M I L L I O N C O .



S U L L I V A N C O .

ENGINEERING SOILS MAP VIGO COUNTY

INDIANA
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